SEQUENCE LISTING

<110> H. William Harris
Edward M. Brown
Steven C. Hebert

<120> Polycation-Sensing Receptor in Aquatic Species and Methods of Use Thereof

<130> 2856.1001-007

<140> 09/162,021
<141> 1998-09-28

<150> PCT/US97/05031
<151> 1997-03-27

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gcagaaatcc tccaggcatc ctctgtaaac gggctggcgt agtgtggctt ggtcaaggaa 420
cagagacagg gctgcaca atg gct cag ctt cac tgc caa ctc tta ttc ttg   471
                    Met Ala Gln Leu His Cys Gln Leu Leu Phe Leu
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gga ttt aca ctc cta cag tcg tac aat gtc tca ggg tat ggt cca aac   519
Gly Phe Thr Leu Leu Gln Ser Tyr Asn Val Ser Gly Tyr Gly Pro Asn
            15                  20                  25

caa agg gcc cag aag aaa gga gac atc ata ctg gga ggt ctc ttc cca   567
Gln Arg Ala Gln Lys Lys Gly Asp Ile Ile Leu Gly Gly Leu Phe Pro
        30                  35                  40

ata cac ttt gga gta gcc gcc aag gat cag gac tta aaa tcg aga ccg   615
Ile His Phe Gly Val Ala Ala Lys Asp Gln Asp Leu Lys Ser Arg Pro
    45                  50                  55
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gag gcg aca aaa tgt att cgg tac aat ttt cga ggc ttc cga tgg ctc 663
Glu Ala Thr Lys Cys Ile Arg Tyr Asn Phe Arg Gly Phe Arg Trp Leu
60 65 70 75

cag gcg atg ata ttc gca att gaa gag att aac aac agt atg act ttc 711
Gln Ala Met Ile Phe Ala Ile Glu Glu Ile Asn Asn Ser Met Thr Phe
80 85 90

ctg ccc aat atc acc ctg gga tat cgc ata ttt gac acg tgt aac acc 759
Leu Pro Asn Ile Thr Leu Gly Tyr Arg Ile Phe Asp Thr Cys Asn Thr
95 100 105

gtg tcc aag gcg cta gag gca aca ctc agc ttt gtg gcc cag aac aaa 807
Val Ser Lys Ala Leu Glu Ala Thr Leu Ser Phe Val Ala Gln Asn Lys
110 115 120

atc gac tcg ctg aac tta gat gag ttc tgt aac tgc tct gac cat atc 855
Ile Asp Ser Leu Asn Leu Asp Glu Phe Cys Asn Cys Ser Asp His Ile
125 130 135

cca tcc aca ata gca gtg gtc ggg gca acc ggg tca gga atc tcc acg 903
Pro Ser Thr Ile Ala Val Val Gly Ala Thr Gly Ser Gly Ile Ser Thr
140 145 150 155

gct gtg gcc aat cta ttg gga tta ttt tac att cca cag gtc agc tat 951
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160 165 170

gcc tcc tcg agc agg ctg ctc agc aac aag aat gag tac aag gcc ttc 999
Ala Ser Ser Ser Arg Leu Leu Ser Asn Lys Asn Glu Tyr Lys Ala Phe
175 180 185

ctg agg acc atc ccc aat gat gag caa cag gcc acg gcc atg gcc gag 1047
Leu Arg Thr Ile Pro Asn Asp Glu Gln Gln Ala Thr Ala Met Ala Glu
190 195 200

atc atc gag cac ttc cag tgg aac tgg gtg gga acc ctg gca gcc gac 1095
Ile Ile Glu His Phe Gln Trp Asn Trp Val Gly Thr Leu Ala Ala Asp
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gat gac tat ggc cgc cca ggc att gac aag ttc cgg gag gag gcc gtt 1143
Asp Asp Tyr Gly Arg Pro Gly Ile Asp Lys Phe Arg Glu Glu Ala Val
220 225 230 235

aag agg gac atc tgt att gac ttc agt gag atg atc tct cag tac tac 1191
Lys Arg Asp Ile Cys Ile Asp Phe Ser Glu Met Ile Ser Gln Tyr Tyr
240 245 250

acc cag aag cag ttg gag ttc atc gcc gac gtc atc cag aac tcc tcg 1239
Thr Gln Lys Gln Leu Glu Phe Ile Ala Asp Val Ile Gln Asn Ser Ser
255 260 265

gcc aag gtc atc gtg gtc ttc tcc aat ggc ccc gac ctg gag ccg ctc 1287
Ala Lys Val Ile Val Val Phe Ser Asn Gly Pro Asp Leu Glu Pro Leu
270 275 280

atc cag gag ata gtt cgg aga aac atc acc gat cgg atc tgg ctg gcc 1335
Ile Gln Glu Ile Val Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala
285 290 295

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agc gag gct tgg gcc agc tct tcg ctc att gcc aag cca gag tac ttc    1383
Ser Glu Ala Trp Ala Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Phe
300                 305                 310                 315

cac gtg gtc ggc ggc acc atc ggc ttc gct ctc agg gcg ggg cgt atc    1431
His Val Val Gly Gly Thr Ile Gly Phe Ala Leu Arg Ala Gly Arg Ile
                320                 325                 330

cca ggg ttc aac aag ttc ctg aag gag gtc cac ccc agc agg tcc tcg    1479
Pro Gly Phe Asn Lys Phe Leu Lys Glu Val His Pro Ser Arg Ser Ser
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gac aat ggg ttt gtc aag gag ttc tgg gag gag acc ttc aac tgc tac    1527
Asp Asn Gly Phe Val Lys Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr
        350                 355                 360

ttc acc gag aag acc ctg acg cag ctg aag aat tcc aag gtg ccc tcg    1575
Phe Thr Glu Lys Thr Leu Thr Gln Leu Lys Asn Ser Lys Val Pro Ser
    365                 370                 375

cac gga ccg gcg gct caa ggg gac ggc tcc aag gcg ggg aac tcc aga    1623
His Gly Pro Ala Ala Gln Gly Asp Gly Ser Lys Ala Gly Asn Ser Arg
380                 385                 390                 395

cgg aca gcc cta cgc cac ccc tgc act ggg gag gag aac atc acc agc    1671
Arg Thr Ala Leu Arg His Pro Cys Thr Gly Glu Glu Asn Ile Thr Ser
                400                 405                 410

gtg gag acc ccc tac ctg gat tat aca cac ctg agg atc tcc tac aat    1719
Val Glu Thr Pro Tyr Leu Asp Tyr Thr His Leu Arg Ile Ser Tyr Asn
            415                 420                 425

gta tac gtg gcc gtc tac tcc att gct cac gcc ctg caa gac atc cac    1767
Val Tyr Val Ala Val Tyr Ser Ile Ala His Ala Leu Gln Asp Ile His
        430                 435                 440

tct tgc aaa ccc ggc acg ggc atc ttt gca aac gga tct tgt gca gat    1815
Ser Cys Lys Pro Gly Thr Gly Ile Phe Ala Asn Gly Ser Cys Ala Asp
    445                 450                 455

att aaa aaa gtt gag gcc tgg cag gtc ctc aac cat ctg ctg cat ctg    1863
Ile Lys Lys Val Glu Ala Trp Gln Val Leu Asn His Leu Leu His Leu
460                 465                 470                 475

aag ttt acc aac agc atg ggt gag cag gtt gac ttt gac gat caa ggt    1911
Lys Phe Thr Asn Ser Met Gly Glu Gln Val Asp Phe Asp Asp Gln Gly
                480                 485                 490

gac ctc aag ggg aac tac acc att atc aac tgg cag ctc tcc gca gag    1959
Asp Leu Lys Gly Asn Tyr Thr Ile Ile Asn Trp Gln Leu Ser Ala Glu
            495                 500                 505

gat gaa tcg gtg ttg ttc cat gag gtg ggc aac tac aac gcc tac gct    2007
Asp Glu Ser Val Leu Phe His Glu Val Gly Asn Tyr Asn Ala Tyr Ala
        510                 515                 520

aag ccc agt gac cga ctc aac atc aac gaa aag aaa atc ctc tgg agt    2055
Lys Pro Ser Asp Arg Leu Asn Ile Asn Glu Lys Lys Ile Leu Trp Ser
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ggc ttc tcc aaa gtg gtt cct ttc tcc aac tgc agt cga gac tgt gtg    2103
Gly Phe Ser Lys Val Val Pro Phe Ser Asn Cys Ser Arg Asp Cys Val
540                 545                 550                 555

ccg ggc acc agg aag ggg atc atc gag ggg gag ccc acc tgc tgc ttt    2151
Pro Gly Thr Arg Lys Gly Ile Ile Glu Gly Glu Pro Thr Cys Cys Phe
                560                 565                 570

gaa tgc atg gca tgt gca gag gga gag ttc agt gat gaa aac gat gca    2199
Glu Cys Met Ala Cys Ala Glu Gly Glu Phe Ser Asp Glu Asn Asp Ala
            575                 580                 585

agt gcg tgt aca aag tgc ccg aat gat ttc tgg tcg aat gag aac cac    2247
Ser Ala Cys Thr Lys Cys Pro Asn Asp Phe Trp Ser Asn Glu Asn His
        590                 595                 600

acg tcg tgc atc gcc aag gag atc gag tac ctg tcg tgg acg gag ccc    2295
Thr Ser Cys Ile Ala Lys Glu Ile Glu Tyr Leu Ser Trp Thr Glu Pro
    605                 610                 615

ttc ggg atc gct ctg acc atc ttc gcc gta ctg ggc atc ctg atc acc    2343
Phe Gly Ile Ala Leu Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr
620                 625                 630                 635

tcc ttc gtg ctg ggg gtc ttc atc aag ttc agg aac act ccc atc gtg    2391
Ser Phe Val Leu Gly Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val
                640                 645                 650

aag gcc acc aac cgg gag ttg tcc tac ctg ctg ctc ttc tcc ctc atc    2439
Lys Ala Thr Asn Arg Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile
            655                 660                 665

tgc tgc ttc tcc agc tcg ctc atc ttc atc ggc gag ccc agg gac tgg    2487
Cys Cys Phe Ser Ser Ser Leu Ile Phe Ile Gly Glu Pro Arg Asp Trp
        670                 675                 680

acc tgt cgg ctc cgc caa ccg gcc ttt ggc atc agc ttc gtc ctg tgc    2535
Thr Cys Arg Leu Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys
    685                 690                 695

atc tcc tgc atc ctg gtg aag acc aac cgg gtg ctg ctg gtc ttc gag    2583
Ile Ser Cys Ile Leu Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu
700                 705                 710                 715

gcc aag atc ccc acc agc ctc cac cgc aag tgg gtg ggc ctc aac ctg    2631
Ala Lys Ile Pro Thr Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu
                720                 725                 730

cag ttc ctc ctg gtc ttc ctc tgc atc ctg gtg caa atc gtc acc tgc    2679
Gln Phe Leu Leu Val Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys
            735                 740                 745

atc atc tgg ctc tac acc gcg cct ccc tcc agc tac agg aac cat gag    2727
Ile Ile Trp Leu Tyr Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu
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ctg gag gac gag gtc atc ttc atc acc tgc gac gag ggc tcg ctc atg    2775
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Leu Glu Asp Glu Val Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met
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gcg ctg ggc ttc ctc atc ggc tac acc tgc ctc ctc gcc gcc atc tgc   2823
Ala Leu Gly Phe Leu Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys
780                 785                 790                 795

ttc ttc ttc gcc ttc aag tcc cgt aag ctg ccg gag aac ttc aac gag   2871
Phe Phe Phe Ala Phe Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu
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gct aag ttc atc acc ttc agc atg ttg atc ttc ttc atc gtc tgg atc   2919
Ala Lys Phe Ile Thr Phe Ser Met Leu Ile Phe Phe Ile Val Trp Ile
            815                 820                 825

tcc ttc atc ccc gcc tat gtc agc acc tac ggc aag ttt gtg tcg gcc   2967
Ser Phe Ile Pro Ala Tyr Val Ser Thr Tyr Gly Lys Phe Val Ser Ala
        830                 835                 840

gtg gag gtg att gcc atc ctg gcc tcc agc ttc ggg ctg ctg ggc tgc   3015
Val Glu Val Ile Ala Ile Leu Ala Ser Ser Phe Gly Leu Leu Gly Cys
    845                 850                 855

att tac ttc aac aag tgt tac atc atc ctg ttc aag ccg tgc cgt aac   3063
Ile Tyr Phe Asn Lys Cys Tyr Ile Ile Leu Phe Lys Pro Cys Arg Asn
860                 865                 870                 875

acc atc gag gag gtg cgc tgc agc acg gcg gcc cac gcc ttc aag gtg   3111
Thr Ile Glu Glu Val Arg Cys Ser Thr Ala Ala His Ala Phe Lys Val
                880                 885                 890

gcg gcc cgg gcc acc ctc cgg cgc agc gcc gcg tct cgc aag cgc tcc   3159
Ala Ala Arg Ala Thr Leu Arg Arg Ser Ala Ala Ser Arg Lys Arg Ser
            895                 900                 905

agc agc ctg tgc ggc tcc acc atc tcc tcg ccc gcc tcg tcc acc tgc   3207
Ser Ser Leu Cys Gly Ser Thr Ile Ser Ser Pro Ala Ser Ser Thr Cys
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ggg ccg ggc ctc acc atg gag atg cag cgc tgc agc acg cag aag gtc   3255
Gly Pro Gly Leu Thr Met Glu Met Gln Arg Cys Ser Thr Gln Lys Val
    925                 930                 935

agc ttc ggc agc ggc acc gtc acc ctg tcg ctc agc ttc gag gag aca   3303
Ser Phe Gly Ser Gly Thr Val Thr Leu Ser Leu Ser Phe Glu Glu Thr
940                 945                 950                 955

ggc cga tac gcc acc ctc agc cgc acg gcc cgc agc agg aac tcg gcg   3351
Gly Arg Tyr Ala Thr Leu Ser Arg Thr Ala Arg Ser Arg Asn Ser Ala
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gat ggc cgc agc ggc gac gac ctg cca tct aga cac cac gac cag ggc   3399
Asp Gly Arg Ser Gly Asp Asp Leu Pro Ser Arg His His Asp Gln Gly
            975                 980                 985

ccg cct cag aaa tgc gag ccc cag ccc gcc aac gat gcc cga tac aag   3447
Pro Pro Gln Lys Cys Glu Pro Gln Pro Ala Asn Asp Ala Arg Tyr Lys
        990                 995                 1000
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gcg gcg ccg acc aag ggc acc cta gag tcg ccg ggc ggc agc aag gag 3495
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1005 1010 1015

cgc ccc aca act atg gag gaa acc taa tccaactcct ccatcaaccc 3542
Arg Pro Thr Thr Met Glu Glu Thr *
1020 1025

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Lys Gly Asp Ile Ile Leu Gly Gly Leu Phe Pro Ile His Phe Gly Val
35 40 45
Ala Ala Lys Asp Gln Asp Leu Lys Ser Arg Pro Glu Ala Thr Lys Cys
50 55 60
Ile Arg Tyr Asn Phe Arg Gly Phe Arg Trp Leu Gln Ala Met Ile Phe
65 70 75 80
Ala Ile Glu Glu Ile Asn Asn Ser Met Thr Phe Leu Pro Asn Ile Thr
85 90 95
Leu Gly Tyr Arg Ile Phe Asp Thr Cys Asn Thr Val Ser Lys Ala Leu
100 105 110
Glu Ala Thr Leu Ser Phe Val Ala Gln Asn Lys Ile Asp Ser Leu Asn
115 120 125
Leu Asp Glu Phe Cys Asn Cys Ser Asp His Ile Pro Ser Thr Ile Ala
130 135 140
Val Val Gly Ala Thr Gly Ser Gly Ile Ser Thr Ala Val Ala Asn Leu
145 150 155 160
Leu Gly Leu Phe Tyr Ile Pro Gln Val Ser Tyr Ala Ser Ser Ser Arg
165 170 175
Leu Leu Ser Asn Lys Asn Glu Tyr Lys Ala Phe Leu Arg Thr Ile Pro
180 185 190
Asn Asp Glu Gln Gln Ala Thr Ala Met Ala Glu Ile Ile Glu His Phe
195 200 205
Gln Trp Asn Trp Val Gly Thr Leu Ala Ala Asp Asp Asp Tyr Gly Arg
210 215 220
Pro Gly Ile Asp Lys Phe Arg Glu Glu Ala Val Lys Arg Asp Ile Cys
225 230 235 240
Ile Asp Phe Ser Glu Met Ile Ser Gln Tyr Tyr Thr Gln Lys Gln Leu
245 250 255
Glu Phe Ile Ala Asp Val Ile Gln Asn Ser Ser Ala Lys Val Ile Val
260 265 270

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Val Phe Ser Asn Gly Pro Asp Leu Glu Pro Leu Ile Gln Glu Ile Val
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Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp Ala
    290                 295                 300
Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Phe His Val Val Gly Gly
305                 310                 315                 320
Thr Ile Gly Phe Ala Leu Arg Ala Gly Arg Ile Pro Gly Phe Asn Lys
                325                 330                 335
Phe Leu Lys Glu Val His Pro Ser Arg Ser Ser Asp Asn Gly Phe Val
            340                 345                 350
Lys Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr Phe Thr Glu Lys Thr
        355                 360                 365
Leu Thr Gln Leu Lys Asn Ser Lys Val Pro Ser His Gly Pro Ala Ala
    370                 375                 380
Gln Gly Asp Gly Ser Lys Ala Gly Asn Ser Arg Arg Thr Ala Leu Arg
385                 390                 395                 400
His Pro Cys Thr Gly Glu Glu Asn Ile Thr Ser Val Glu Thr Pro Tyr
                405                 410                 415
Leu Asp Tyr Thr His Leu Arg Ile Ser Tyr Asn Val Tyr Val Ala Val
            420                 425                 430
Tyr Ser Ile Ala His Ala Leu Gln Asp Ile His Ser Cys Lys Pro Gly
        435                 440                 445
Thr Gly Ile Phe Ala Asn Gly Ser Cys Ala Asp Ile Lys Lys Val Glu
    450                 455                 460
Ala Trp Gln Val Leu Asn His Leu Leu His Leu Lys Phe Thr Asn Ser
465                 470                 475                 480
Met Gly Glu Gln Val Asp Phe Asp Asp Gln Gly Asp Leu Lys Gly Asn
                485                 490                 495
Tyr Thr Ile Ile Asn Trp Gln Leu Ser Ala Glu Asp Glu Ser Val Leu
            500                 505                 510
Phe His Glu Val Gly Asn Tyr Asn Ala Tyr Ala Lys Pro Ser Asp Arg
        515                 520                 525
Leu Asn Ile Asn Glu Lys Lys Ile Leu Trp Ser Gly Phe Ser Lys Val
    530                 535                 540
Val Pro Phe Ser Asn Cys Ser Arg Asp Cys Val Pro Gly Thr Arg Lys
545                 550                 555                 560
Gly Ile Ile Glu Gly Glu Pro Thr Cys Cys Phe Glu Cys Met Ala Cys
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Ala Glu Gly Glu Phe Ser Asp Glu Asn Asp Ala Ser Ala Cys Thr Lys
            580                 585                 590
Cys Pro Asn Asp Phe Trp Ser Asn Glu Asn His Thr Ser Cys Ile Ala
        595                 600                 605
Lys Glu Ile Glu Tyr Leu Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu
    610                 615                 620
Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr Ser Phe Val Leu Gly
625                 630                 635                 640
Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg
                645                 650                 655
Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser Ser
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Ser Leu Ile Phe Ile Gly Glu Pro Arg Asp Trp Thr Cys Arg Leu Arg
        675                 680                 685
Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile Leu
    690                 695                 700
Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu Ala Lys Ile Pro Thr
705                 710                 715                 720
Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu Gln Phe Leu Leu Val
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Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys Ile Ile Trp Leu Tyr
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Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu Leu Glu Asp Glu Val
        755                 760                 765
Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met Ala Leu Gly Phe Leu
    770                 775                 780
Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala Phe
785                 790                 795                 800
Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu Ala Lys Phe Ile Thr
                805                 810                 815
Phe Ser Met Leu Ile Phe Phe Ile Val Trp Ile Ser Phe Ile Pro Ala
            820                 825                 830
Tyr Val Ser Thr Tyr Gly Lys Phe Val Ser Ala Val Glu Val Ile Ala
        835                 840                 845
Ile Leu Ala Ser Ser Phe Gly Leu Leu Gly Cys Ile Tyr Phe Asn Lys
    850                 855                 860
Cys Tyr Ile Ile Leu Phe Lys Pro Cys Arg Asn Thr Ile Glu Glu Val
865                 870                 875                 880
Arg Cys Ser Thr Ala Ala His Ala Phe Lys Val Ala Ala Arg Ala Thr
                885                 890                 895
Leu Arg Arg Ser Ala Ala Ser Arg Lys Arg Ser Ser Ser Leu Cys Gly
            900                 905                 910
Ser Thr Ile Ser Ser Pro Ala Ser Ser Thr Cys Gly Pro Gly Leu Thr
        915                 920                 925
Met Glu Met Gln Arg Cys Ser Thr Gln Lys Val Ser Phe Gly Ser Gly
    930                 935                 940
Thr Val Thr Leu Ser Leu Ser Phe Glu Glu Thr Gly Arg Tyr Ala Thr
945                 950                 955                 960
Leu Ser Arg Thr Ala Arg Ser Arg Asn Ser Ala Asp Gly Arg Ser Gly
                965                 970                 975
Asp Asp Leu Pro Ser Arg His His Asp Gln Gly Pro Pro Gln Lys Cys
            980                 985                 990
Glu Pro Gln Pro Ala Asn Asp Ala Arg Tyr Lys Ala Ala Pro Thr Lys
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Gly Thr Leu Glu Ser Pro Gly Gly Ser Lys Glu Arg Pro Thr Thr Met
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1025
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 1               5                  10                  15

ata gat aag ttt cga gaa gaa gct gaa gag agg gac atc tgc ata gat   96
Ile Asp Lys Phe Arg Glu Glu Ala Glu Glu Arg Asp Ile Cys Ile Asp
            20                  25                  30

ttc aat gag atg att tct cag tac tat aca caa aaa gag ctg gag ttt  144
Phe Asn Glu Met Ile Ser Gln Tyr Tyr Thr Gln Lys Glu Leu Glu Phe
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         35                  40                  45

att gca gat act att cag aat tcc tca gcc aaa gtg att gty gtc ttc      192
Ile Ala Asp Thr Ile Gln Asn Ser Ser Ala Lys Val Ile Xaa Val Phe
    50                  55                  60

tca aat ggc cct gac ttg gaa cca cta ata caa gag ata gtt cga cgg      240
Ser Asn Gly Pro Asp Leu Glu Pro Leu Ile Gln Glu Ile Val Arg Arg
65                  70                  75                  80

aac ata act gat aga ata tgg cta gca agt gaa gcg tgg gct agt tcc      288
Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp Ala Ser Ser
                85                  90                  95

tca ctg ata gcc aaa cca gaa tac ttc cat gtt gtt ggt gga acc att      336
Ser Leu Ile Ala Lys Pro Glu Tyr Phe His Val Val Gly Gly Thr Ile
            100                 105                 110

gga ttt gca cta aga gca gga cgc atc cca gga ttc cat gag ttt tta      384
Gly Phe Ala Leu Arg Ala Gly Arg Ile Pro Gly Phe His Glu Phe Leu
        115                 120                 125

aaa aag gtc cat ccc agc agg tcc tcc cac aat ggc ttt gtc aag gaa      432
Lys Lys Val His Pro Ser Arg Ser Ser His Asn Gly Phe Val Lys Glu
    130                 135                 140

ttc tgg gaa gaa aca ttt aat tgt tat ttc act gaa gaa tcc cta aca      480
Phe Trp Glu Glu Thr Phe Asn Cys Tyr Phe Thr Glu Glu Ser Leu Thr
145                 150                 155                 160

caa cta aag aat tgc aaa aca cca acc cat gga tta gca atg cac aat      528
Gln Leu Lys Asn Cys Lys Thr Pro Thr His Gly Leu Ala Met His Asn
                165                 170                 175

gac agt gcg aaa atg ggg cat tcc aca agg aca acg tta cga cct cca      576
Asp Ser Ala Lys Met Gly His Ser Thr Arg Thr Thr Leu Arg Pro Pro
            180                 185                 190

tgc act gga gaa gag aat atc acg agt gtg gag acc cct tac ctg gat      624
Cys Thr Gly Glu Glu Asn Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
        195                 200                 205

tat act cac ctc cgt att tca tat aat gtg tat gtg gca gtg tat tcg      672
Tyr Thr His Leu Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
    210                 215                 220

att gct cac gct ctg cag gac atc tat gcc tgc aca cct ggg aag ggg      720
Ile Ala His Ala Leu Gln Asp Ile Tyr Ala Cys Thr Pro Gly Lys Gly
225                 230                 235                 240

att ttt gcg aac gga tca tgt gcc gat atc aaa aaa gtc gaa gcc tgg      768
Ile Phe Ala Asn Gly Ser Cys Ala Asp Ile Lys Lys Val Glu Ala Trp
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aat cca tat gac tag t                                                784
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<400> 4

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Leu Leu Val Ile Trp Ile Ala Ala Asp Asp Asp Tyr Gly Arg Pro Gly
 1               5                  10                  15
Ile Asp Lys Phe Arg Glu Glu Ala Glu Glu Arg Asp Ile Cys Ile Asp
            20                  25                  30
Phe Asn Glu Met Ile Ser Gln Tyr Tyr Thr Gln Lys Glu Leu Glu Phe
        35                  40                  45
Ile Ala Asp Thr Ile Gln Asn Ser Ser Ala Lys Val Ile Val Val Phe
    50                  55                  60
Ser Asn Gly Pro Asp Leu Glu Pro Leu Ile Gln Glu Ile Val Arg Arg
65                  70                  75                  80
Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp Ala Ser Ser
                85                  90                  95
Ser Leu Ile Ala Lys Pro Glu Tyr Phe His Val Val Gly Gly Thr Ile
            100                 105                 110
Gly Phe Ala Leu Arg Ala Gly Arg Ile Pro Gly Phe His Glu Phe Leu
        115                 120                 125
Lys Lys Val His Pro Ser Arg Ser Ser His Asn Gly Phe Val Lys Glu
    130                 135                 140
Phe Trp Glu Glu Thr Phe Asn Cys Tyr Phe Thr Glu Glu Ser Leu Thr
145                 150                 155                 160
Gln Leu Lys Asn Cys Lys Thr Pro Thr His Gly Leu Ala Met His Asn
                165                 170                 175
Asp Ser Ala Lys Met Gly His Ser Thr Arg Thr Thr Leu Arg Pro Pro
            180                 185                 190
Cys Thr Gly Glu Glu Asn Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
        195                 200                 205
Tyr Thr His Leu Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
    210                 215                 220
Ile Ala His Ala Leu Gln Asp Ile Tyr Ala Cys Thr Pro Gly Lys Gly
225                 230                 235                 240
Ile Phe Ala Asn Gly Ser Cys Ala Asp Ile Lys Lys Val Glu Ala Trp
                245                 250                 255
Asn Pro Tyr Asp
            260
```

<210> 5
<211> 598
<212> DNA
<213> squalus acanthias

<220>
<221> CDS
<222> (3)...(598)

<400> 5

```
tt ctg aca ata ttt gct gtg cta gga ata ctg atc act tcc ttt gtt    47
   Leu Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr Ser Phe Val
    1               5                  10                  15

ttg gga gta ttc att aag ttc aga aat act cct att gtg aaa gcc act   95
Leu Gly Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val Lys Ala Thr
                20                  25                  30
```

```
aac aga gaa ctc tcc tat ctc ctc ctc ttc tcc tta atc tgc tgt ttc   143
Asn Arg Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile Cys Cys Phe
            35                  40                  45

tcc agc tca ttg atc ttc att gga gaa ccc aaa gat tgg acc tgc aga   191
Ser Ser Ser Leu Ile Phe Ile Gly Glu Pro Lys Asp Trp Thr Cys Arg
        50                  55                  60

ctg cgt caa cct gca ttt gga atc agc ttt gtg ctg tgc att tct tgc   239
Leu Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys
    65                  70                  75

att ctg gtg aaa act aat cgt gtg cta ttg gtc ttt gag gcc aag atc   287
Ile Leu Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu Ala Lys Ile
80                  85                  90                  95

cca act agc ctc cat cga aag tgg gtg ggc ctc aat ttg caa ttc tta   335
Pro Thr Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu Gln Phe Leu
                100                 105                 110

ctg gtt ttc ctc tgt att ctt gtg caa att gtt act tgt gtc atc tgg   383
Leu Val Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys Val Ile Trp
            115                 120                 125

ctt tac aca gca ccc cct tcg agc tac aga aat cat gaa cta gaa gat   431
Leu Tyr Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu Leu Glu Asp
        130                 135                 140

gaa atc att ttt att aca tgt gat gaa ggt tcc tta atg gca ctt ggt   479
Glu Ile Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met Ala Leu Gly
    145                 150                 155

ttt ctc att ggt tac aca tgc ctc ctt gct gcc att tgc ttc ttt ttt   527
Phe Leu Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe
160                 165                 170                 175

gcc ttt aag tct cgc aaa ctc cca gag aac ttc aat gag gcc aaa ttt   575
Ala Phe Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu Ala Lys Phe
                180                 185                 190

att acc ttc agc atg ctg ata tt                                   598
Ile Thr Phe Ser Met Leu Ile
            195
```

<210> 6
<211> 198
<212> PRT
<213> squalus acanthias

<400> 6

```
Leu Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr Ser Phe Val Leu
 1               5                  10                  15
Gly Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn
            20                  25                  30
Arg Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser
        35                  40                  45
Ser Ser Leu Ile Phe Ile Gly Glu Pro Lys Asp Trp Thr Cys Arg Leu
```

```
    50                  55                  60
Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile
65                  70                  75                  80
Leu Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu Ala Lys Ile Pro
                85                  90                  95
Thr Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu Gln Phe Leu Leu
            100                 105                 110
Val Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys Val Ile Trp Leu
        115                 120                 125
Tyr Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu Leu Glu Asp Glu
    130                 135                 140
Ile Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met Ala Leu Gly Phe
145                 150                 155                 160
Leu Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala
                165                 170                 175
Phe Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu Ala Lys Phe Ile
            180                 185                 190
Thr Phe Ser Met Leu Ile
        195
```


<210> 7
<211> 594
<212> DNA
<213> psuedupleuronecies americanus

<220>
<221> CDS
<222> (2)...(592)

<400> 7

```
g ttg acc ata tgt gca gtg ctg ggt gtt gcc ytg acg ggc ttc gtg atg 49
  Leu Thr Ile Cys Ala Val Leu Gly Val Ala Xaa Thr Gly Phe Val Met
   1               5                  10                  15

gcc gtc ttt gtc cga ttc cgc aac acc cca ata gtg aaa gcc acg aac   97
Ala Val Phe Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn
             20                  25                  30

cga gaa ctg tcc tac gtc ctc ctg ttc tct ctc atc tgt tgc ttc tcc   145
Arg Glu Leu Ser Tyr Val Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser
         35                  40                  45

agc tcc ctc atc ttc ata gga gag ccg cag gat tgg atg tgc cgc tta   193
Ser Ser Leu Ile Phe Ile Gly Glu Pro Gln Asp Trp Met Cys Arg Leu
     50                  55                  60

cgc caa ccg gcc ttt ggg atc agt ttt gtt ctc tgt atc tcg tgc atc   241
Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile
 65                  70                  75                  80

ctt gtg aaa aca aac cka gtc ctc ttg gtg ttt gaa gcc aag atc ccg   289
Leu Val Lys Thr Asn Xaa Val Leu Leu Val Phe Glu Ala Lys Ile Pro
                 85                  90                  95

aca agt ctc cat cgt aaa tgg tgg ggg tta aac cta cag ttc ctg ctg   337
Thr Ser Leu His Arg Lys Trp Trp Gly Leu Asn Leu Gln Phe Leu Leu
             100                 105                 110
```

gtg ttt ctg tgc aca ttt gtc caa gtc atg ata tgt gtg gtc tgg ctg 385
Val Phe Leu Cys Thr Phe Val Gln Val Met Ile Cys Val Val Trp Leu
115 120 125

tac aac gcc cca cct tcc agt tac agg aat tat gac ata gat gag atg 433
Tyr Asn Ala Pro Pro Ser Ser Tyr Arg Asn Tyr Asp Ile Asp Glu Met
130 135 140

att ttt atc aca tgt aat gaa ggc tct gta atg gct ctt ggg ttt ctt 481
Ile Phe Ile Thr Cys Asn Glu Gly Ser Val Met Ala Leu Gly Phe Leu
145 150 155 160

att ggc tat aca tgc ctg ctg gcc gct ata tgt ttc ttc ttt gca ttc 529
Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala Phe
165 170 175

aaa tca cgg aaa ctt cca gaa aac ttc acc gag gct aag ttc atc act 577
Lys Ser Arg Lys Leu Pro Glu Asn Phe Thr Glu Ala Lys Phe Ile Thr
180 185 190

ttt agt atg ctc ata tt 594
Phe Ser Met Leu Ile
195

<210> 8
<211> 197
<212> PRT
<213> psuedupleuronecies americanus

<220>
<221> VARIANT
<222> (1)...(197)
<223> Xaa = Any Amino Acid

<400> 8
Leu Thr Ile Cys Ala Val Leu Gly Val Ala Leu Thr Gly Phe Val Met
1 5 10 15
Ala Val Phe Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn
20 25 30
Arg Glu Leu Ser Tyr Val Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser
35 40 45
Ser Ser Leu Ile Phe Ile Gly Glu Pro Gln Asp Trp Met Cys Arg Leu
50 55 60
Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile
65 70 75 80
Leu Val Lys Thr Asn Xaa Val Leu Leu Val Phe Glu Ala Lys Ile Pro
85 90 95
Thr Ser Leu His Arg Lys Trp Trp Gly Leu Asn Leu Gln Phe Leu Leu
100 105 110
Val Phe Leu Cys Thr Phe Val Gln Val Met Ile Cys Val Val Trp Leu
115 120 125
Tyr Asn Ala Pro Pro Ser Ser Tyr Arg Asn Tyr Asp Ile Asp Glu Met
130 135 140
Ile Phe Ile Thr Cys Asn Glu Gly Ser Val Met Ala Leu Gly Phe Leu
145 150 155 160
Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala Phe
165 170 175
Lys Ser Arg Lys Leu Pro Glu Asn Phe Thr Glu Ala Lys Phe Ile Thr

```
            180                 185                 190
Phe Ser Met Leu Ile
        195
```

<210> 9
<211> 475
<212> DNA
<213> paralichthus dentalus

<220>
<221> CDS
<222> (3)...(473)

<400> 9

```
tg tcg tgg acg gag ccc ttt ggg atc gcg ttg gcc ata tgt gca gcg    47
   Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile Cys Ala Ala
    1               5                  10                  15

ctg ggt gtt gcc ttg acg ggc ttc gtg atg gcc gtc ttt atc aga ttc   95
Leu Gly Val Ala Leu Thr Gly Phe Val Met Ala Val Phe Ile Arg Phe
                20                  25                  30

cgc aac acc cca ata gtg aag gcc acg aac cga gaa ctg tcc tat gtc   143
Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu Ser Tyr Val
            35                  40                  45

ctc ctg ttc tct ctc atc tgt tgc ttc tcc agt tcc ctc atc ttt att   191
Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu Ile Phe Ile
        50                  55                  60

gga gag ccg cag gat tgg atg tgt cgt tta cgc caa cct gcc ttt ggg   239
Gly Glu Pro Gln Asp Trp Met Cys Arg Leu Arg Gln Pro Ala Phe Gly
    65                  70                  75

atc agt ttt gtt ctc tgt atc tcc tgc atc ctt gtg aaa act aat aga   287
Ile Ser Phe Val Leu Cys Ile Ser Cys Ile Leu Val Lys Thr Asn Arg
80                  85                  90                  95

gta ctc tta gta ttt gaa gcc aag atc ccc aca agt ctc cat cgt aaa   335
Val Leu Leu Val Phe Glu Ala Lys Ile Pro Thr Ser Leu His Arg Lys
                100                 105                 110

tgg tgg ggg tta aac ctt cag ttt ttg ctg gtg ttt ctg tgc aca ttt   383
Trp Trp Gly Leu Asn Leu Gln Phe Leu Leu Val Phe Leu Cys Thr Phe
            115                 120                 125

gtc caa gtc atg atc tgt gtt gtc tgg ctg tac aat gcc cct ccc tcc   431
Val Gln Val Met Ile Cys Val Val Trp Leu Tyr Asn Ala Pro Pro Ser
        130                 135                 140

agt tac agg aat tat gac ata gat gag atg att ttt atc aca           473
Ser Tyr Arg Asn Tyr Asp Ile Asp Glu Met Ile Phe Ile Thr
    145                 150                 155

tg                                                                475
```

<210> 10
<211> 157

<212> PRT
<213> paralichthus dentalus

<400> 10

```
Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile Cys Ala Ala Leu
 1               5                  10                  15
Gly Val Ala Leu Thr Gly Phe Val Met Ala Val Phe Ile Arg Phe Arg
            20                  25                  30
Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu Ser Tyr Val Leu
        35                  40                  45
Leu Phe Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu Ile Phe Ile Gly
    50                  55                  60
Glu Pro Gln Asp Trp Met Cys Arg Leu Arg Gln Pro Ala Phe Gly Ile
65                  70                  75                  80
Ser Phe Val Leu Cys Ile Ser Cys Ile Leu Val Lys Thr Asn Arg Val
                85                  90                  95
Leu Leu Val Phe Glu Ala Lys Ile Pro Thr Ser Leu His Arg Lys Trp
            100                 105                 110
Trp Gly Leu Asn Leu Gln Phe Leu Leu Val Phe Leu Cys Thr Phe Val
        115                 120                 125
Gln Val Met Ile Cys Val Val Trp Leu Tyr Asn Ala Pro Pro Ser Ser
    130                 135                 140
Tyr Arg Asn Tyr Asp Ile Asp Glu Met Ile Phe Ile Thr
145                 150                 155
```

<210> 11
<211> 1308
<212> DNA
<213> cyclopterus lumpus

<220>
<221> CDS
<222> (2)...(1306)

<400> 11

```
a cgc cca ggg att gaa aaa ttt gag aag gag atg gag gag cga gac atc 49
  Arg Pro Gly Ile Glu Lys Phe Glu Lys Glu Met Glu Glu Arg Asp Ile
   1               5                  10                  15

tgc att cac ctt aat gaa ctt atc tct cag tat ttt gag gay cat gaa   97
Cys Ile His Leu Asn Glu Leu Ile Ser Gln Tyr Phe Glu Asp His Glu
            20                  25                  30

atc caa gcg ctg gct gac agg att gag aac tcc aca gct aaa gtc atc   145
Ile Gln Ala Leu Ala Asp Arg Ile Glu Asn Ser Thr Ala Lys Val Ile
        35                  40                  45

gta gtg ttt gcc agc ggc cca gat atc gag cct tta atc aaa gag atg   193
Val Val Phe Ala Ser Gly Pro Asp Ile Glu Pro Leu Ile Lys Glu Met
    50                  55                  60

gtg agg aga aac atc aca gac cgt atc tgg tta gcc agt gaa gcg tgg   241
Val Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp
65                  70                  75                  80

gct agc tcc tct ctt ata gct aaa cca gag tat ctt gat gtt gtg gct   289
Ala Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Leu Asp Val Val Ala
                85                  90                  95
```

```
ggg act atc ggc ttt gct ctc aag gca ggg cat att cct ggc tta aga   337
Gly Thr Ile Gly Phe Ala Leu Lys Ala Gly His Ile Pro Gly Leu Arg
            100                 105                 110

gag ttc cta cag caa gtg caa cca aag aga gac agt cat aat gaa ttt   385
Glu Phe Leu Gln Gln Val Gln Pro Lys Arg Asp Ser His Asn Glu Phe
        115                 120                 125

gtc agg gag ttt tgg gaa gaa acc ttc aac tgt tat ctg gaa gac agc   433
Val Arg Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr Leu Glu Asp Ser
    130                 135                 140

cag aga cag cag gaa agt gag aat ggc agc aca agt ttc agg cct ttg   481
Gln Arg Gln Gln Glu Ser Glu Asn Gly Ser Thr Ser Phe Arg Pro Leu
145                 150                 155                 160

tgt act ggt gag gaa gac atc aca agt gtt gag acc ccg tac ttg gac   529
Cys Thr Gly Glu Glu Asp Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
                165                 170                 175

tac aca cac ttt cgt atc tcc tat aac gtg tat gtt gca gtt tat tcc   577
Tyr Thr His Phe Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
            180                 185                 190

att gca cag gcc ctg cag gac ata ctc acc tgc aca cct gga cat gga   625
Ile Ala Gln Ala Leu Gln Asp Ile Leu Thr Cys Thr Pro Gly His Gly
        195                 200                 205

ctc ttt gcc aac aat tcc tgt gcc gat ata aag aaa atg gaa gca tgg   673
Leu Phe Ala Asn Asn Ser Cys Ala Asp Ile Lys Lys Met Glu Ala Trp
    210                 215                 220

cag gcc ctg aag cag ctt aga cat ttg aac tac acc aac agc atg ggg   721
Gln Ala Leu Lys Gln Leu Arg His Leu Asn Tyr Thr Asn Ser Met Gly
225                 230                 235                 240

gaa aag atg cac ttt gat gag aac tca gac atg gca tca aac tac acc   769
Glu Lys Met His Phe Asp Glu Asn Ser Asp Met Ala Ser Asn Tyr Thr
                245                 250                 255

att ata aac tgg cac cgg tct gct gag gat ggc tct gtg gtg ttt gag   817
Ile Ile Asn Trp His Arg Ser Ala Glu Asp Gly Ser Val Val Phe Glu
            260                 265                 270

gac gtg gga tac tac agc atg cac gtc aag aga gga gcc aaa ctg ttc   865
Asp Val Gly Tyr Tyr Ser Met His Val Lys Arg Gly Ala Lys Leu Phe
        275                 280                 285

att gac aag aca aag att ttg tgg aat gga tac agt tcg gag gcg cca   913
Ile Asp Lys Thr Lys Ile Leu Trp Asn Gly Tyr Ser Ser Glu Ala Pro
    290                 295                 300

ttc tct aat tgc agt gag gac tgt gaa cct ggt aca agg aag ggg atc   961
Phe Ser Asn Cys Ser Glu Asp Cys Glu Pro Gly Thr Arg Lys Gly Ile
305                 310                 315                 320

att gac agt atg ccc aca tgt tgc ttt gaa tgc act gag tgc tca gat  1009
Ile Asp Ser Met Pro Thr Cys Cys Phe Glu Cys Thr Glu Cys Ser Asp
```

325 330 335

gga gag tac agt aat cat aaa gat gcc agt gtt tgc acc aag tgt cca 1057
Gly Glu Tyr Ser Asn His Lys Asp Ala Ser Val Cys Thr Lys Cys Pro
340 345 350

tat aac tct tgg tcc aat ggg aat cac aca ttc tgc ttc ctg aag gaa 1105
Tyr Asn Ser Trp Ser Asn Gly Asn His Thr Phe Cys Phe Leu Lys Glu
355 360 365

atc gag ttt ctc tcc tgg aca gaa cca ttc ggg ata gct ttg gcc ata 1153
Ile Glu Phe Leu Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile
370 375 380

tgt gca gta ctg ggt gtg ctc ttg aca gct ttt gtg atc gga gtc ttt 1201
Cys Ala Val Leu Gly Val Leu Leu Thr Ala Phe Val Ile Gly Val Phe
385 390 395 400

gtc aga ttc cgc aac acc cca ata gtg aag gcc aca aac cga gaa ctg 1249
Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu
405 410 415

tcc tac gtt ctc ctg twc tca ctt atc tgt tgc ttc tca agc tcc ctc 1297
Ser Tyr Val Leu Leu Xaa Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu
420 425 430

akc ttc atc gg 1308
Xaa Phe Ile
435

<210> 12
<211> 435
<212> PRT
<213> cyclopterus lumpus

<220>
<221> VARIANT
<222> (1)...(435)
<223> Xaa = Any Amino Acid

<400> 12
Arg Pro Gly Ile Glu Lys Phe Glu Lys Glu Met Glu Glu Arg Asp Ile
1 5 10 15
Cys Ile His Leu Asn Glu Leu Ile Ser Gln Tyr Phe Glu Asp His Glu
20 25 30
Ile Gln Ala Leu Ala Asp Arg Ile Glu Asn Ser Thr Ala Lys Val Ile
35 40 45
Val Val Phe Ala Ser Gly Pro Asp Ile Glu Pro Leu Ile Lys Glu Met
50 55 60
Val Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp
65 70 75 80
Ala Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Leu Asp Val Val Ala
85 90 95
Gly Thr Ile Gly Phe Ala Leu Lys Ala Gly His Ile Pro Gly Leu Arg
100 105 110
Glu Phe Leu Gln Gln Val Gln Pro Lys Arg Asp Ser His Asn Glu Phe
115 120 125
Val Arg Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr Leu Glu Asp Ser

```
    130                 135                 140
Gln Arg Gln Gln Glu Ser Glu Asn Gly Ser Thr Ser Phe Arg Pro Leu
145                 150                 155                 160
Cys Thr Gly Glu Glu Asp Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
                165                 170                 175
Tyr Thr His Phe Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
            180                 185                 190
Ile Ala Gln Ala Leu Gln Asp Ile Leu Thr Cys Thr Pro Gly His Gly
        195                 200                 205
Leu Phe Ala Asn Asn Ser Cys Ala Asp Ile Lys Lys Met Glu Ala Trp
    210                 215                 220
Gln Ala Leu Lys Gln Leu Arg His Leu Asn Tyr Thr Asn Ser Met Gly
225                 230                 235                 240
Glu Lys Met His Phe Asp Glu Asn Ser Asp Met Ala Ser Asn Tyr Thr
                245                 250                 255
Ile Ile Asn Trp His Arg Ser Ala Glu Asp Gly Ser Val Val Phe Glu
            260                 265                 270
Asp Val Gly Tyr Tyr Ser Met His Val Lys Arg Gly Ala Lys Leu Phe
        275                 280                 285
Ile Asp Lys Thr Lys Ile Leu Trp Asn Gly Tyr Ser Ser Glu Ala Pro
    290                 295                 300
Phe Ser Asn Cys Ser Glu Asp Cys Glu Pro Gly Thr Arg Lys Gly Ile
305                 310                 315                 320
Ile Asp Ser Met Pro Thr Cys Cys Phe Glu Cys Thr Glu Cys Ser Asp
                325                 330                 335
Gly Glu Tyr Ser Asn His Lys Asp Ala Ser Val Cys Thr Lys Cys Pro
            340                 345                 350
Tyr Asn Ser Trp Ser Asn Gly Asn His Thr Phe Cys Phe Leu Lys Glu
        355                 360                 365
Ile Glu Phe Leu Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile
    370                 375                 380
Cys Ala Val Leu Gly Val Leu Leu Thr Ala Phe Val Ile Gly Val Phe
385                 390                 395                 400
Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu
                405                 410                 415
Ser Tyr Val Leu Leu Xaa Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu
            420                 425                 430
Xaa Phe Ile
        435
```

<210> 13
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> primer

<400> 13
```
Asp Asp Asp Tyr Gly Arg Pro Gly Ile Glu Lys Phe Arg Glu Glu Ala
 1               5                  10                  15
Glu Glu Arg Asp Ile Cys Ile
            20
```

<210> 14
<211> 17
<212> PRT

<213> Artificial Sequence

<220>
<223> primer

<400> 14
Ala Arg Ser Arg Asn Ser Ala Asp Gly Arg Ser Gly Asp Asp Leu Pro
 1   5   10   15
Cys

<210> 15
<211> 20
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (3)...(3)
<223> N = deoxyinosine

<221> unsure
<222> (9)...(9)
<223> Y = C+T

<221> unsure
<222> (12)...(12)
<223> Y = C+T

<221> unsure
<222> (15)...(15)
<223> Y = C+T

<221> unsure
<222> (18)...(18)
<223> Y = C+T

<400> 15
gcngctgayg aygaytaygg 20

<210> 16
<211> 24
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (4)...(4)
<223> N=deoxyinosine

<221> unsure
<222> (7)...(7)
<223> Y=C+T

<221> unsure
<222> (10)...(10)
<223> N=deoxyinosine

<221> unsure
<222> (13)...(13)
<223> Y=C+T

<221> unsure
<222> (16)...(16)
<223> Y=C+T

<221> unsure
<222> (22)...(22)
<223> R=A+G

<400> 16
ccangcytcn agyttyttda trtc 24

<210> 17
<211> 28
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (5)...(5)
<223> K=T+G

<221> unsure
<222> (20)...(20)
<223> Y=C+T

<221> unsure
<222> (23)...(23)
<223> R=A+G

<400> 17
tgtcktggac ggagccctty ggratcgc 28

<210> 18
<211> 34
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (7)...(7)
<223> K=T+G

<221> unsure
<222> (10)...(10)
<223> R=A+G

<221> unsure
<222> (16)...(16)
<223> R=A+G

<221> unsure
<222> (19)...(19)
<223> K=T+G

<221> unsure

<222> (25)...(25)
<223> R=A+G

<221> unsure
<222> (28)...(28)
<223> R=A+G

<400> 18
ataggckggr atgaargaka tccaracrat gaag 34

<210> 19
<211> 31
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (4)...(4)
<223> K=T+G

<221> unsure
<222> (7)...(7)
<223> R=A+G

<221> unsure
<222> (13)...(13)
<223> R=A+G

<221> unsure
<222> (16)...(16)
<223> K=T+G

<221> unsure
<222> (22)...(22)
<223> R=A+G

<221> unsure
<222> (25)...(25)
<223> R=A+G

<400> 19
ggckggratg aargakatcc aracratgaa g 31